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IS 6614 (1972): Aluminium chloride, anhydrous, technical  
[CHD 1: Inorganic Chemicals]



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( Reaffirmed 1978 )

## *Indian Standard*

# SPECIFICATION FOR ALUMINIUM CHLORIDE, ANHYDROUS, TECHNICAL

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# Indian Standard

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## *Indian Standard*

# SPECIFICATION FOR ALUMINIUM CHLORIDE, ANHYDROUS, TECHNICAL

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 26 July 1972, after the draft finalized by the Alkalis and Chlorine Sectional Committee had been approved by the Chemical Division Council.

**0.2** Aluminium chloride, anhydrous, technical finds extensive use in Friedel-Crafts' reaction specially in the manufacture of anthraquinone and dyestuffs, in cracking of petroleum; in the manufacture of rubber, and lubricants; in preserving wood, in refining of crude oil, dyeing of fabrics; and in manufacture of parchment paper.

**0.3** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard prescribes the requirements and the method of sampling and test for aluminium chloride, anhydrous, technical.

### 2. REQUIREMENTS

**2.1 Description** — The aluminium chloride, anhydrous, technical shall be grey or yellow to greenish with strong hydrochloric acid odour.

**2.2** The material shall also comply with the requirements given in Table 1 when tested in accordance with the methods prescribed in Appendix A.

**2.3 Iron Content** — The iron content shall be 0.05 percent by mass, maximum or as agreed to between the purchaser and the supplier when tested according to the method prescribed in Appendix B.

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\*Rules for rounding off numerical values (*revised*).

TABLE 1 REQUIREMENTS FOR ALUMINIUM CHLORIDE, ANHYDROUS, TECHNICAL

( Clause 2.2 )

| SL No. | CHARACTERISTICS                                  | REQUIREMENT | METHOD OF TEST<br>( REF TO CL NO. IN<br>APPENDIX A ) |
|--------|--|-------------|--|
| (1)    | (2)  | (3)         | (4)  |
| i)     | Insoluble matter, percent<br>by mass, <i>Max</i> | 0.5         | A-2  |
| ii)    | Assay, percent by mass,<br><i>Min</i>            | 98.0        | A-3  |

### 3. PACKING AND MARKING

**3.1 Packing** — Anhydrous aluminium chloride shall be packed in moisture-proof steel drums provided with an outer polyethylene liner and an inner PVC liner. The liners shall be either sealed or knotted separately, the knot secured by suitable plastic thread. The container will be provided with a close fitting cover with rubber gasket and tightening ring to securely close it.

**3.1.1** For smaller packings the material shall be packed in amber coloured glass bottles provided with well-fitting ground glass stoppers or in airtight high density polyethylene bottles.

**3.2 Marking** — The containers shall be securely closed and marked legibly and indelibly with the following information:

- a) Name of the material;
- b) Name of the manufacturer and trade-mark, if any;
- c) Tare, gross and net weight of the material; and
- d) Lot or batch number, if any, or alternatively, date of packing.

**3.2.1** The container shall also be marked with the following information:

#### C A U T I O N

CORROSIVE SOLID, IRRITATING TO SKIN, WASH SPILLAGE WITH AMPLE WATER, REMOVE LEAKING DRUMS TO WELL VENTILATED PLACE, KEEP AWAY FROM FIRE AND WATER, STORE IN A COOL AND DRY PLACE



**3.2.2** The containers may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

#### 4. SAMPLING

**4.1** Representative samples of the material shall be drawn and their conformity to this standard shall be determined in accordance with the method prescribed in Appendix C.

## APPENDIX A

( Clause 2.2, and Table 1 )

### ANALYSIS OF ALUMINIUM CHLORIDE, ANHYDROUS, TECHNICAL

#### A-1. QUALITY OF REAGENTS

**A-1.1** Unless specified otherwise, pure chemicals and distilled water ( *see* IS : 1070-1960\* ) shall be used in the tests.

**NOTE** — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

#### A-2. DETERMINATION OF INSOLUBLE MATTER

**A-2.1 Procedure** — Weigh accurately about 2 g of the material and transfer it into a 600-ml glass beaker. Add cautiously, lifting the watch glass, 200 ml of distilled water. Allow to stand for 15 to 20 minutes with occasional stirring to allow for complete dissolution. Filter through a weighed sintered glass crucible ( G No. 4 ) or Gooch crucible and wash with water till the filtrate is free of acid. Dry it at  $105 \pm 2^{\circ}\text{C}$  to constant weight.

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\*Specification for water, distilled quality ( *revised* ).

**A-2.2 Calculation**

$$\text{Insoluble matter, percent by mass} = 100 \frac{m}{M}$$

where

$m$  = mass in g of the residue, and

$M$  = mass in g of the material taken for the test.

**A-3. DETERMINATION OF ALUMINIUM CHLORIDE CONTENT****A-3.1 Apparatus**

**A-3.1.1 Silica Crucible** — 50 ml capacity.

**A-3.1.2 Asbestos Sheet** — A thick asbestos sheet (15 × 15 cm approximately) with a hole in the centre of such dimensions that the silica crucible just fits at the rim.

**A-3.1.3 Stoppered Weighing Bottle** — 60 mm long and 30 mm diameter.

**A-3.2 Procedure** — Take 10 to 11 g of anhydrous aluminium chloride in the weighing bottle and stopper immediately, so as not to expose the material to the atmosphere. Weigh accurately ( $W_1$ ) and transfer it quickly to the accurately weighed silica crucible ( $W_3$ ), which has been placed in the asbestos sheet on the tripod stand inside a fuming chamber and immediately stopper the weighing bottle and transfer it to a desiccator. Immediately start heating the crucible with a regulated burner (at a temperature of approximately 250°C) so that the entire crucible is heated uniformly. Weigh the empty weighing bottle accurately ( $W_2$ ). Carry on ignition till all aluminium chloride is sublimed as indicated by absence of fumes. Continue calcining for about 30 minutes. Cool in a desiccator over calcium chloride and weigh accurately the cooled crucible ( $W_4$ ).

**A-3.3 Calculation**

$$\begin{aligned} &\text{Aluminium chloride content} \\ &\text{percent by mass} \end{aligned} = \frac{(W_1 - W_2) - (W_4 - W_3)}{W_1 - W_2} 100$$

where

$W_1$  = mass in g of the weighing bottle with sample,

$W_2$  = mass in g of the weighing bottle after transferring the sample,

$W_4$  = mass in g of the crucible with residue after sublimation, and

$W_3$  = mass in g of the crucible.

**APPENDIX B**

( Clause 2.3 )

**DETERMINATION OF IRON****B-1. APPARATUS****B-1.1 Nessler Cylinders** — 50 ml capacity.**B-1.2 Reagents****B-1.2.1 Dilute Hydrochloric Acid** — approximately 4 N.**B-1.2.2 Ammonium Persulphate****B-1.2.3 Ammonium Thiocyanate Solution** — Dissolve 30 g of the ammonium thiocyanate ( $\text{NH}_4\text{CNS}$ ) in water and dilute to 100 ml.**B-1.2.4 Standard Iron Solution** — Dissolve 0.702 g of ferrous ammonium sulphate [ $\text{FeSO}_4 (\text{NH}_4)_2 \text{SO}_4 \cdot 6\text{H}_2\text{O}$ ] in 10 ml of 10 percent sulphuric acid, and dilute to 1 000 ml with water. One millilitre of the solution contains 0.1 mg of iron (as Fe).**B-1.3 Procedure** — Dissolve 1.0 g of the accurately weighed material in 10 ml of water contained in a Nessler cylinder. Add 2 ml of dilute hydrochloric acid and dilute to about 45 ml. Add about 30 mg of ammonium persulphate and 3 ml of ammonium thiocyanate. Dilute to 50 ml and mix. Carry out a control test in another Nessler cylinder taking 5 ml of standard iron solution. Add 2 ml of dilute hydrochloric acid, about 30 mg of ammonium persulphate and 3 ml of ammonium thiocyanate. Dilute to the mark and mix.**B-1.3.1** The limits prescribed in 2.3 shall be taken as not having been exceeded if the colour produced with the sample is not more intense than that produced with the standard iron solution.**APPENDIX C**

( Clause 4.1 )

**SAMPLING OF ALUMINIUM CHLORIDE****C-1. GENERAL REQUIREMENTS OF SAMPLING****C-1.0** In drawing samples, the following precautions and directions shall be observed.

**C-1.1** Precautions shall be taken to protect the samples, the sampling instrument and the containers for samples from adventitious contamination.

**C-1.2** The sampled material shall be placed in suitable, dry, clean container.

**C-1.3** Each sample container shall be sealed air-tight after filling and marked with full details of sampling.

**C-1.4** Samples shall be taken from different parts of the containers using suitable sampling instrument.

## C-2. SCALE OF SAMPLING

**C-2.1** All the containers in a consignment of aluminium chloride, anhydrous, technical, taken from a single batch of manufacture shall constitute a lot.

**C-2.2** Samples shall be tested for each lot for ascertaining the conformity of the material to the requirements of the specification.

**C-2.3** The number ( $n$ ) of containers to be selected from the lot shall depend upon the size of the lot ( $N$ ) and shall be in accordance with col 1 and 2 of Table 2.

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**TABLE 2 NUMBER OF CONTAINERS TO BE SELECTED**

| LOT SIZE      | NO. OF CONTAINERS<br>TO BE SELECTED |
|---------------|-------------------------------------|
| $N$           | $n$                                 |
| (1)           | (2)                                 |
| Up to 25      | 3                                   |
| 26 „ 50       | 4                                   |
| 51 „ 100      | 5                                   |
| 101 and above | 7                                   |

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**C-2.4** These containers shall be selected at random from the lot. For random selection procedures, guidance may be sought from IS : 4905-1968\*.

## C-3. PREPARATION OF TEST SAMPLES

**C-3.1** From each of the selected containers 100 g of aluminium chloride shall be withdrawn with the help of a sampling instrument. Out of the portions so collected equal quantity of the material shall be taken out and mixed together to form a composite sample of about 150 g. The remaining

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\*Method for random sampling.

portions corresponding to each of the selected containers shall be transferred to separate sample bottles and these sample bottles containing aluminium chloride shall be termed as individual samples.

**C-3.2** Tests for aluminium chloride content shall be conducted on individual samples. Tests for all the other characteristics shall be made on the composite sample.

#### **C-4. CRITERIA FOR CONFORMITY OF THE LOT**

**C-4.1 Aluminium Chloride Content** — From the individual test results on assay the mean  $\bar{X}$  and the range ( $R$ ) of the test results shall be calculated (range being defined as the differences between the maximum and minimum values). The values of the expression ( $\bar{X} - 0.6R$ ) shall be greater than or equal to the corresponding value given in col 3 of Table 1.

**C-4.2 For Other Characteristics** — The test results for other characteristics tested on the composite sample shall satisfy the relevant requirements.

**C-4.3** A lot shall be declared as conforming to the requirements of this specification if **C-4.1** and **C-4.2** are both complied with.

# INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

## Base Units

| Quantity                  | Unit     | Symbol |
|---------------------------|----------|--------|
| Length                    | metre    | m      |
| Mass                      | kilogram | kg     |
| Time                      | second   | s      |
| Electric current          | ampere   | A      |
| Thermodynamic temperature | kelvin   | K      |
| Luminous intensity        | candela  | cd     |
| Amount of substance       | mole     | mol    |

## Supplementary Units

| Quantity    | Unit      | Symbol |
|-------------|-----------|--------|
| Plane angle | radian    | rad    |
| Solid angle | steradian | sr     |

## Derived Units

| Quantity             | Unit    | Symbol | Conversion                      |
|----------------------|---------|--------|---------------------------------|
| Force                | newton  | N      | 1 N = 1 kg.m/s <sup>2</sup>     |
| Energy               | joule   | J      | 1 J = 1 N.m                     |
| Power                | watt    | W      | 1 W = 1 J/s                     |
| Flux                 | weber   | Wb     | 1 Wb = 1 V.s                    |
| Flux density         | tesla   | T      | 1 T = 1 Wb/m <sup>2</sup>       |
| Frequency            | hertz   | Hz     | 1 Hz = 1 c/s (s <sup>-1</sup> ) |
| Electric conductance | siemens | S      | 1 S = 1 A/V                     |
| Pressure, stress     | pascal  | Pa     | 1 Pa = 1 N/m <sup>2</sup>       |

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